

- 1 1. A method for optimizing a wireless electromagnetic communications network,
2 comprising:
3 a wireless electromagnetic communications network, comprising
4 a set of nodes, said set of nodes further comprising,
5 at least a first subset wherein each node is MIMO-capable,
6 comprising:
7 an antennae array of M antennae, where $M \geq$ one,
8 a transceiver for each antenna in said spatially diverse
9 antennae array,
10 means for digital signal processing to convert analog radio
11 signals into digital signals and digital signals into analog
12 radio signals,
13 means for coding and decoding data, symbols, and control
14 information into and from digital signals,
15 diversity capability means for transmission and reception of
16 said analog radio waves[signals],
17 and,
18 means for input and output from and to a non-radio
19 interface for digital signals;
20 said set of nodes being deployed according to design rules that prefer
21 meeting the following criteria:
22 said set of nodes further comprising two or more proper subsets of
23 nodes, with a first proper subset being the transmit uplink / receive
24 downlink set, and a second proper subset being the transmit
25 downlink / receive uplink set;
26 each node in said set of nodes belonging to no more transmitting
27 uplink or receiving uplink subsets than it has diversity capability
28 means;
29 each node in a transmit uplink / receive downlink subset has no
30 more nodes with which it will hold time and frequency coincident

31 communications in its field of view, than it has diversity
32 capability;
33 each node in a transmit downlink / receive uplink subset has no
34 more nodes with which it will hold time and frequency coincident
35 communications in its field of view, than it has diversity
36 capability;
37 each member of a transmit uplink / receive downlink subset cannot
38 hold time and frequency coincident communications with any
39 other member of that transmit uplink / receive downlink subset;
40 and,
41 each member of a transmit downlink / receive uplink subset cannot
42 hold time and frequency coincident communications with any
43 other member of that transmit downlink / receive uplink subset;
44 transmitting, in said wireless electromagnetic communications network,
45 independent information from each node belonging to a first proper subset, to one
46 or more receiving nodes belonging to a second proper subset that are viewable
47 from the transmitting node;
48 processing independently, in said wireless electromagnetic communications
49 network, at each receiving node belonging to said second proper subset,
50 information transmitted from one or more nodes belonging to said first proper
51 subset;
52 and,
53 dynamically adapting the diversity channels[capability means] and said proper
54 subsets to optimize said network.
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57 2. A method for optimizing a wireless electromagnetic communications network,
58 comprising:
59 a wireless electromagnetic communications network, comprising
60 a set of nodes, said set of nodes further comprising,

61 at least a first subset wherein each node is MIMO-capable,
62 comprising:
63 a spatially diverse antennae array of M antennae, where M
64 \geq two,
65 a transceiver for each antenna in said spatially diverse
66 antennae array,
67 means for digital signal processing to convert analog radio
68 signals into digital signals and digital signals into analog
69 radio signals,
70 means for coding and decoding data, symbols, and control
71 information into and from digital signals,
72 diversity capability means for transmission and reception of
73 said analog radio waves[signals],
74 and,
75 means for input and output from and to a non-radio
76 interface for digital signals;
77 said set of nodes being deployed according to design rules that prefer
78 meeting the following criteria:
79 said set of nodes further comprising two or more proper subsets of
80 nodes, with a first proper subset being the transmit uplink / receive
81 downlink set, and a second proper subset being the transmit
82 downlink / receive uplink set;
83 each node in said set of nodes belonging to no more transmitting
84 uplink or receiving uplink subsets than it has diversity capability
85 means;
86 each node in a transmit uplink / receive downlink subset has no
87 more nodes with which it will hold time and frequency coincident
88 communications in its field of view, than it has diversity
89 capability;
90 each node in a transmit downlink / receive uplink subset has no
91 more nodes with which it will hold time and frequency coincident

92 communications in its field of view, than it has diversity
93 capability;
94 each member of a transmit uplink / receive downlink subset cannot
95 hold time and frequency coincident communications with any
96 other member of that transmit uplink / receive downlink subset;
97 and,
98 each member of a transmit downlink / receive uplink subset cannot
99 hold time and frequency coincident communications with any
100 other member of that transmit downlink / receive uplink subset;
101 transmitting, in said wireless electromagnetic communications network,
102 independent information from each node belonging to a first proper subset, to one
103 or more receiving nodes belonging to a second proper subset that are viewable
104 from the transmitting node;
105 processing independently, in said wireless electromagnetic communications
106 network, at each receiving node belonging to said second proper subset,
107 information transmitted from one or more nodes belonging to said first proper
108 subset;
109 and,
110 dynamically adapting the diversity channels [capability means] and said proper
111 subsets to optimize said network.

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114 3. A method as in claim 1, wherein dynamically adapting the diversity channels and
115 said proper subsets to optimize said network further comprises:

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117 using substantive null steering to minimize SINR between nodes transmitting and
118 receiving information.

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120 4. A method as in claim 1, wherein dynamically adapting the diversity channels and
121 said proper subsets to optimize said network further comprises:

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